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[Bulletins 246 to 257 constitute the Report for 1916. In binding, pages i-xvi at the end of this bulletin should be detached and placed before Bulletin 246 which begins with page 1]

Maine Agricultural Experiment Station

BULLETIN 257 DECEMBER, 1916

ABSTRACTS OF PAPERS NOT INCLUDED IN BULLETINS, FINANCES, METEOROLOGY, INDEX

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MAINE
AGRICULTURAL EXPERIMENT STATION
ORONO, MAINE.

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ROYDEN L. HAMMOND,		*Seed Analyst and Photographer*
CHARLES C. INMAN,		*Assistant*

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†In collaboration with U. S. Department of Agriculture.

D. of D.
MAY 28 1917

BULLETIN 257.

ABSTRACTS OF PAPERS PUBLISHED BY THE STATION IN 1916 BUT NOT INCLUDED IN THE BULLETINS.

A complete list of all the publications issued by and from the Station in 1916 is given on pages xii to xiv of the introduction to this Report. The following pages contain abstracts of the papers issued during the year that are not included in the Bulletins or Official Inspections for the year.

A METHOD OF CORRECTING FOR SOIL HETEROGENEITY IN VARIETY TESTS.*

The correct interpretation of field trials, such as variety tests, fertilizer experiments, etc., is often rendered difficult, if not impossible, because of the great differences in soil in different parts of the same field. This is often true even in fields which to the eye appear quite uniform. Nevertheless, field trials are becoming more and more a necessity in many phases of agricultural investigation.

Within recent years a number of investigators have shown that the experimental error in such trials can be greatly reduced by the use of systematically repeated plots. Nevertheless, if the number of repetitions is not large, certain experiments may still be unduly influenced by irregularities in the field. It would therefore be desirable if some method could be devised by which the yields of individual plots could be corrected in such a way as to take account of these irregularities.

Check plots have frequently been used for this purpose. many cases.

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*This is an abstract from a paper by Frank M. Surface and Raymond Pearl having the same title and published in the Journal of Agricultural Research, Vol. V. pp. 1039-1050, 1916.

But, aside from the extra labor and expense involved, the results from check plots have been far from satisfactory in

In the present paper a method is proposed for use in correcting for differences in the soil of different plots. The method in its present form is adapted for use only when the plots are arranged in rectangular blocks. The method of obtaining this correction factor is as follows: In the first place the probable yield of each plot is obtained by the contingency method. This "calculated" yield represents the most probable yield of each plot on the supposition that they have all been planted with a hypothetical variety whose mean yield is the same as the observed means of the field.

This "calculated" yield may then be used as a basis for determining a correction factor. If the calculated yield of a given plot is above the mean of the field it must be taken that the soil of this plot is better than the average of the field and a corresponding amount must be deducted from the observed yield. Likewise, if the calculated yield is below the average, a proportional amount must be added to the observed yield in order to make the plots comparable.

Still more comparable results will be obtained if the correction factors are based upon the percentage of the mean rather than upon the absolute figures.

Tests of the efficiency of this method by means of the measure of soil heterogeneity proposed by Harris show in all cases a very marked reduction in the amount of heterogeneity when the corrected figures are used. When tested on our own experimental plots, this method leads to results which from other evidence, we have reason to believe, more nearly represent the truth than do the uncorrected yields.

It is realized that this method is not ideal and does not obviate all the difficulties connected with soil differences in plot experiments. It is hoped that this method may prove useful in certain kinds of plot experiments and that it may lead to further study of this problem.

FECUNDITY IN THE DOMESTIC FOWL AND THE SELECTION PROBLEM.*

The purpose of this paper was to answer certain criticisms which had been made of the writer's studies on the inheritance of fecundity and breeding for egg production. Also the paper contains a general discussion of certain theoretical aspects of the selection problem.

STUDIES ON OAT BREEDING III. ON THE INHERITANCE OF CERTAIN GLUME CHARACTERS IN THE CROSS *AVENA FATUA* x *A. SATIVA* var. KHERSON.†

This paper describes the results obtained from crosses between a wild oat of the species *Avena fatua* and a cultivated variety known as the Kherson. The object of this work is to find out how various characters of oats are inherited and this can be done much better when there are a large number of different characters as in the case of these two varieties.

The characters which were studied were (1) color of the glumes or grain; (2) the wild vs. cultivated character of the base; (3) awns on the grain; and (4) pubescence on various regions of the grain, viz. at the base of the grain, on the pedicel, and on the back of the lower and upper grain of each spikelet.

The wild parent in this cross has a black glume color, while the Kherson is a yellow oat. The F_1 grain is black and in the F_2 generation, plants with black, gray and yellow grains appear in the proportion of 12 black; 3 gray; 1 yellow. The wild and cultivated character of the base of the grain segregates, giving in the second generation 3 cultivated to 1 wild. The character of the base is entirely independent of the color of the grain.

The very heavy awns characteristic of the wild oats appear in the progeny only on the grains which have the wild type of base. There are, however, several intermediate types of awning which appear on the cultivated grain in the second generation. The relation of these to the color and other characters is discussed.

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*This is an abstract of a paper by Raymond Pearl, having the same title and published in the American Naturalist, Vol. L, pp. 89-105, 1916.

†This is an abstract of a paper by Frank M. Surface having the same title and published in Genetics, Vol. 1, pp. 252-286, 1916.

The heavy pubescence at the base of the grain as well as that on the pedicel is also linked in its inheritance with the wild type of base. The linkage in these cases appears to be absolute since in this cross no wild plants were found which lack the heavy awns and the pubescence described above.

The pubescence on the back of the two grains is inherited in a peculiar manner. The pubescence on the back of the larger or lower grain of the spikelet is linked with the factor for black color, but the linkage is not absolute, although very close. This linkage is of such a nature that when the cross is made as described above, one out of every 150 F_2 plants will be either a black grain without pubescence or a non-black grain with pubescence.

On the other hand the pubescence on the back of the smaller or upper grain will appear only when the lower grain is also pubescent. Even then it appears very infrequently on grain which has a cultivated base. In other words, the factor for pubescence on the back of the upper grain is linked with the factor for the wild base of the grain.

STUDIES ON THE PHYSIOLOGY OF REPRODUCTION IN THE DOMESTIC FOWL. XVI. DOUBLE EGGS.*

Among the eggs of the domestic fowl an egg which contains another egg is quite rare, but one or more such specimens have been observed by most persons who have handled large numbers of eggs. This phenomenon has excited the interest of poultrymen and scientists and a number of specimens have been described in the agricultural and scientific literature. The purpose of the paper abstracted is to describe several specimens observed at the Maine Agricultural Experiment Station which have been laid or have been found partly formed within the oviduct at autopsy and to discuss the formation of these abnormalities from the physiological point of view.

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*This is an abstract of a paper by Maynie R. Curtis, having the same title and published in the Biological Bulletin, Vol. xxxi., No. 4, pp. 181-206, 1916.

The chief results of this study were as follows:

1. A membrane-covered or hard-shelled normal or dwarf egg may be returned up the duct and may either meet its successor and return with it, becoming enclosed in a common set of egg envelopes, or not meeting its successor it may again be forced through the duct stimulating the secretion of a set of egg envelopes around itself.

2. The number of egg envelopes common to the enclosed egg and the yolk of the enclosing egg or the number of egg envelopes which surround the enclosed egg when the enclosing egg has no yolk depends apparently on the level of the duct at which the enclosed egg resumes its normal direction toward the cloaca.

3. The enclosed egg is usually forced up the duct without turning on its axis but occasionally the poles are reversed.

4. A similar reversal of poles sometimes occurs in normal laying and it seems probable that in both cases this turning takes place in the uterus when the first powerful contractions of the uterus bring the outwardly directed end of the egg slightly above the opening from the shell gland into the vagina and tangentially against the curved caudo-dorsal angle of the uterus.

5. The enclosed egg usually precedes its successor through the duct and, therefore, usually lies in the pointed or anterior end of the enclosing egg, while the yolk of the enclosing egg lies in the blunt or posterior end.

6. However, in two known cases where the enclosed egg united with its successor after the latter had received practically all its thick albumen there is evidence that the two eggs came side by side in the duct with their long axis parallel and in one case they certainly passed through the duct side by side with their long axes parallel to each other and also parallel to the long axis of the duct.

7. There has been one case described with the yolk in the pointed and the enclosed egg in the blunt end of the enclosing egg. There is some doubt about the accuracy of this observation but it is possible that two eggs can pass in the duct.

8. A hard-shelled egg uncovered by membrane or albumen is sometimes found in the body cavity or upper oviduct while a hard-shelled egg enclosed with another egg is not usually immediately surrounded by an egg membrane. It would, therefore, seem that the egg does not cause the secretion of egg envelopes around itself on its way up the duct.

9. Since in the case of a double-yolked egg a second yolk closely following the first does stimulate the secretion of the successive envelopes, it does not seem probable that the failure of the duct to form envelopes around the returning egg is due to exhaustion of the glands.

10. The reason for this failure is not known. It may be that the return of the egg is very rapid and that the time of application of the stimulus is too short to be effectual, or there may be a real polarity of the duct so that it responds only to a downwardly directed stimulus.

11. A few cases are known where one or more of the normal egg envelopes have not been formed around an egg advancing in the normal direction (for example, a yolk enclosed by egg membrane and shell but with no albumen, or a laid egg composed only of normal yolk and albumen). The cause for these phenomena are not known. In these cases the movement of the egg may have been abnormally rapid.

12. The occurrence of membrane-covered or hard-shelled eggs in the body cavity, the albumen-secreting region of the oviduct or enclosed within the albumen of another egg shows that an egg may be moved up the duct, but since an egg has never been observed moving in this direction the nature of the motion can only be imagined.

13. The double egg results from a modification of the normal processes of egg formation due chiefly to a reversal in the direction of the egg after it has received its membrane or its membrane and shell. The backward movement must cease before the egg is expelled from the funnel mouth and the movement in the normal direction must be resumed.

14. If the backward movement sets in before the egg receives its membrane but stops before it is expelled from the funnel mouth and if the normal direction is then resumed, the result will be a normal egg with a large percentage of albumen

or in case the returned egg meets its successor, a double-yolked egg.

15. If the backward movement of an egg in any stage does not stop too soon the partly or fully formed egg will be expelled from the funnel mouth into the body cavity.

16. In case the oviduct is naturally or artificially closed the eggs are regularly expelled by forcing them out of the funnel mouth.

17. A double egg is the result of a combination of normal and abnormal processes which, when combined in other proportions, result in other abnormal phenomena of egg production.

18. An egg may move backward and forward several times in the duct as is shown by the production of an egg enclosed within a series of concentric egg membranes separated by thick albumen.

A NOTE ON THE INHERITANCE OF EYE PATTERN IN BEANS AND ITS RELATION TO TYPE OF VINE.*

This paper reports the results of some natural crosses between Improved and Old Fashioned Yellow Eye Beans. When these two types of Yellow Eye beans are crossed the seed of the first generation plants are all very much spotted. This type of bean has been called "piebald." When these piebald beans are planted the progeny consist of plants with three different kind of beans. These are Piebald, Improved Yellow Eye, and Old Fashioned Yellow Eye. These three types occur in the proportion of 8 Piebald; 3 Improved Yellow Eye; 4 Old Fashioned Yellow Eye. It is suggested that this ration is due to the presence of two independent factors, one of which is of such a nature that it causes the death of those zygotes which are homozygous for both factors. In this way the usual 8:4:4 ratio is modified to the 8:3:4 ratio found. This suggestion is only tentative and may be modified when a larger number of plants have been studied.

In reference to the type of vine, it had been noted that with few exceptions, all Old Fashioned Yellow Eye beans have a bush type of vine while the majority of the Improved Yellow Eyes have a short runner vine. The first generation of the cross between these two always has a runner type of vine. In the segregating generations it was found that the Old Fashioned Yellow Eye beans were always bush beans while the Piebald and Improved Yellow Eye segregates showed both runner and bush types of vine. The data given are not sufficient to make a detailed study of the inheritance of type of vine, but it is of interest to note that there is a very close linkage between the Old Fashioned Yellow Eye color pattern and the bush type of vine.

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*This is an abstract of a paper by Frank M. Surface, having the same title and published in the American Naturalist, Vol. 50, pp. 577-586, 1916

ON THE EFFECT OF CONTINUED ADMINISTRATION OF CERTAIN POISONS TO THE DOMESTIC FOWL, WITH SPECIAL REFERENCE TO THE PROGENY.*

The investigation here reported deals with the general problem of the origin and causation of new, heritable variations. That this is one of the most fundamental problems of breeding admits of no doubt. The method by which this general problem is attacked in the present investigation is that of exposing systematically the germ-cells of an animal to something unusual or abnormal in the surrounding conditions, and then analyzing, so far as may be, not only the new heritable variations themselves (provided any such appear), but also the factors which underlie their causation.

The specific problems with which this investigation deals are these:

1. Does the continued administration of certain narcotic poisons to the domestic fowl induce precise and specific changes in the germinal material, such as to lead to new, heritable, somatic variations?

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*This is an abstract of (a) a paper by Raymond Pearl, having the same title, and published in the Proceedings of the American Philosophical Society, Vol. LV, pp. 243-258, 1916, and (b) a paper by the same author, having the title "The Effect of Parental Alcoholism (and certain other Drug Intoxications) upon the Progeny in the Domestic Fowl," and published in the Proceedings of the National Academy of Sciences, Vol. 2, pp. 380-384, 1916.

2. Failing a specific effect is there a general effect upon the germinal material?

3. What in general are the effects upon the soma of the treated individual of the continued administration of such poisons?

4. Are the somatic effects upon the treated individuals of a sort to give any clue to the probable origin, or mechanism of the germinal changes?

The foundation stock used in these experiments came from pedigreed strains of two breeds of poultry, Black Hamburgs and Barred Plymouth Rocks. Both of the strains used have been so long pedigree-bred by the writer, and used in such a variety of Mendelian experiments, that they may be regarded as "reagent strains," whose genetic behavior under ordinary circumstances may be predicted with a degree of probability amounting practically to complete certainty. Furthermore, the results of crossing these two breeds reciprocally have been thoroughly studied.

Three poisons were used in the work, namely, ether, methyl alcohol, and ethyl alcohol. These substances were administered to the birds daily by the inhalation method.

Turning to the results we may note first that the egg production of the treated birds and the untreated controls was entirely normal in respect of its seasonal distribution, as well as in regard to its amount.

There has been *no significant difference* in the egg production of the treated birds and their untreated control sisters, either in the total average number of eggs produced per bird nor in the seasonal distribution of this production. The only conclusion which can be drawn from the statistically insignificant differences which appear between treated and control birds is that the inhalation treatment has not affected the egg production of the birds, either favorably or adversely.

Regarding the *offspring* the results show that out of 12 different characters for which we have exact quantitative data, the offspring of treated parents taken as a group are superior to the offspring of untreated parents in 8 characters. The offspring of untreated parents are superior to those of the treated in respect of but two characters and these are characters which are quite highly correlated with each other and really should be counted as but one single character. Finally with respect to two character groups there is no difference between the treated and the untreated.

We may evaluate our results in general terms as follows:

1. There is no evidence that *specific* germinal changes have been induced by the treatment, at least in those germ cells which produced zygotes.

2. There is no evidence that the germ cells which produced zygotes have in any respect been injured or deleteriously affected.

THE SEPARATE INHERITANCE OF PLUMAGE PATTERN AND PIGMENTATION IN PLYMOUTH ROCKS.*

This paper gives the proof, based on Mendelian breeding experiments, that in the Barred Plymouth Rock the barred pattern is inherited as a separate unit character, distinct from the pigment which makes the pattern visible, which constitutes another unit character. It is shown that the White Plymouth Rock inherits the same pattern as the Barred Plymouth Rock, but fails to show it because it lacks the hereditary determiner for pigment.

A PSYLLID GALL ON JUNCUS (*LIVIA MACULIPENNIS* FITCH).†

Since 1857 when Fitch described this beautiful little insect, nothing more definite in regard to its habits has been recorded than that it is found in swampy places. Thomas in 1879 said that it was "found on the sweet-flag," but there is nothing in his account which would indicate that it fed upon that plant.

This past summer, however, the secret of its habitation was discovered by Miss Cora H. Clarke of Boston, who made an interesting collection of Juncus galls near Magnolia Village,

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*This is an abstract of a paper by Raymond Pearl, having the same title and published in Practical Husbandry of Maine, Vol. VI, pp. 567-568, 1916.

†This is an abstract of a paper with the same title, by Edith M. Patch, published in Psyche, Vol. xxiii, No. 1, with Plate vi.

Mass., on August 17, which she shared with the writer. At this date the galls contained only unknown nymphs of a Psyllid but they were about ready to wing and the adults began to emerge in large numbers on August 20-21. These proved to be *Livia maculipennis* Fitch.

CONCERNING PROBLEMS IN APHID ECOLOGY.*

It is apparent enough that in ecological work with an aphid, the fact of first importance to be ascertained is whether a given species is migratory, for, if it have two types of host plants, the problems that concern its life cycle are doubled, though the economic situation may be simplified by virtue of a greater choice in methods of control.

Why should it not be a simple matter—the mere finding out whether a species is migratory? Partly because every aphid cycle we learn is as likely to mislead as to guide us with the next species we investigate. We are in the habit of saying, for instance, that we know that *Aphis pomi, Myzus cerasi,* and *Schizoneura rileyi* do not migrate because they occur at all times of the year upon a single food plant, respectively the apple, the cherry, and the elm. That in itself is no reason for surety, for *Prociphilus tessellata, P. venafuscus,* and *Schizoneura lanigera* each occurs at all times of the year upon a single food plant, respectively the alder, the balsam fir, and the apple, and yet these are all migratory aphids. There is this distinction between these two cases, however, the three species first mentioned occur at all times of the year upon their *primary* food plant and the second three do not—with them it is their *secondary* food plant which harbors them for twelve months of the year in addition to their winter and spring residence upon their primary host. By "primary host" is understood that plant upon which the over-wintering egg is normally deposited and upon which the stem mother and her immediate progeny develop. The "secondary host" is that plant to which the spring migrants fly and from which they return to the primary host. At present I know of no member of the subfamily *Aphidinæ* which resides for twelve months upon its primary host and in addition migrates for a part of the year to a secondary host. But it would be a rash person who felt safe in the conviction that such a cycle could not be.

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*This is an abstract of a paper with the same title, by Edith M. Patch, published in Journal of Economic Entomology, Vol. 9, pp. 44-51.

Many migratory aphids, to be sure, alternate their primary and secondary host plants at regular intervals, each time entirely deserting the one for the other, thus existing for a part of the year only upon each. *Rhopalosiphum nympheae* Linn is an example of such a cycle with its winter and spring habitation on the plum and its summer residence upon various water plants.

For many reasons it becomes evident that a failure with a migration test gives no data.

If an investigator fails in one hundred attempts to colonize thistle with migrants from plum that will not be a safe reason for him to conclude that he is not working with *Aphis cardui,* or that this thistle aphid has nothing to do with the leaf deformations of the plum in the spring. It has been my own experience that negative data with aphids under such conditions are just no data at all. If the structural characters are such as warrant the migration test in the first place, they warrant a patient continuation even in the face of repeated failures.

On the other hand (and this is the most encouraging and stimulating circumstance in connection with aphid migration tests), a single success goes a long way to prove the case. Barring complications, a single success is enough, and repetitions and verifications are needed only as safeguards in that respect. For these insects are remarkably stable as to their exclusive tastes in vegetable juices and a given species will die before it will submit to the sap of any plant not on its approved dietary. So if the progeny of the migrants accept the food plants given them in the laboratory to the extent of developing upon it from the first instar to maturity, it is safe to conclude that that food plant is one which they would accept in the field under favorable conditions, even though, with the wider choice of the open, a different one might be given preference in certain localities. Such proof should rest with the behavior of the progeny of the migrants and not with the migrants themselves, for the migrants, as has been suggested, have many ways of tantalizing the hopeful investigator.

METEOROLOGICAL OBSERVATIONS.

For many years the meteorological apparatus was located in the Experiment Station building and the observations were made by members of the Station Staff. June 1, 1911, the meteorological apparatus was removed to Wingate Hall and the observations are in charge of Mr. James S. Stevens, professor of physics in the University of Maine.

In September, 1914, the meteorological apparatus was again moved to Aubert Hall, the present headquarters of the physics department.

The instruments used were at Lat. 44° 54′ 2″ N. Lon. 64° 40′ 5″ W. Elevation 135 feet.

The instruments used are the same as those used in preceding years, and include: Maximum and minimum thermometers; rain gauge; self-recording anemometer; vane; and barometers. The observations at Orono now form an almost unbroken record of forty-eight years.

METEOROLOGICAL SUMMARY FOR 1916.

Observations Made at the University of Maine.

1916.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Averages.	Totals.
Highest temperature	49	50	69	65	80	82	94	93	86	81	64	53	....	....
Lowest temperature	-14	-13	0	24	30	37	47	42	33	24	2	-3	....	....
Mean temperature	23.4	20.8	25.2	44.1	54.2	61.4	70.1	68.9	59.6	49.7	34.2	25.5	44.83	....
Mean temperature in 48 years	16.5	12.4	30.0	40.2	51.6	60.8	65.9	66.1	60.0	50.9	38.2	24.4	42.77	....
Total precipitation in inches	2.59	2.61	2.45	3.63	4.42	4.99	4.39	2.27	4.60	1.85	1.60	5.80	....	41.20
Mean precipitation in 48 years	2.49	3.49	4.07	2.96	3.58	3.42	3.42	2.30	3.46	3.79	3.51	3.56	....	....
Number of days with precipitation of .01 or more	10	8	8	9	12	16	11	7	8	6	6	9	....	110
Snowfall in inches	11.5	19.0	24.5	14.0	....	....	....	....	....	....	11.0	35.0	....	115.0
Mean snowfall in 48 years	21.48	21.31	15.19	5.79	0.18	....	....	....	....	0.70	7.11	16.4	....	....
Number of clear days	13	12	21	16	18	18	19	24	20	20	16	16	....	213
Number of fair days	5	4	3	7	5	4	3	4	4	6	2	5	....	52
Number of cloudy days	13	13	7	7	8	8	9	3	6	5	12	10	....	101
Total movement of wind in miles	4060	4171	5010	4289	5043	3570	3857	3251	3731	3886	3706	5244	4152	49818

REPORT OF THE TREASURER.

The Station is a department of the University and its accounts are kept in the office of the Treasurer of the University. The books, voucher files, etc., are, however, all distinct from those of the other departments of the University. The classification of accounts is that prescribed by the auditors on the part of the Federal Government, and approved by the State Auditor. All of the accounts are audited by the State Auditor, and the Hatch Fund and Adams Fund accounts are also audited by the Office of Experiment Stations acting for the United States Secretary of Agriculture in accordance with Federal Law.

The income of the Station from public sources for the year that ended June 30, 1916, was:

U. S. Government, Hatch Fund appropriation....	$15,000 00
U. S. Government, Adams Fund appropriation....	15,000 00
State of Maine, Animal Husbandry investigation appropriation	5,000 00
State of Maine, Aroostook Farm investigation....	5,000 00

The cost of maintaining the laboratories for the inspection analyses is borne by analysis fees and by the State Department of Agriculture. The income from sales at the experiment farms is used for the expense of investigations. The printing which costs about $4,500 is paid for by an appropriation to the University.

All of the disbursements except for printing and the sheep husbandry experiment are given in the tables that follow on the two succeeding pages. The sheep husbandry expenditures for the year ending October 31, 1916, were labor, $153.54; feeding stuffs, $669.68; sundry supplies, $13.33.

REPORT OF TREASURER FOR FISCAL YEAR ENDING JUNE 30, 1916.

DISBURSEMENTS.

RECEIPTS.	Hatch fund.	Adams fund.	Animal husbandry investigations.
Salaries	$6,957 21	$11,586 14	$4,750 32
Labor	2,722 75	30 23	-
Publications	115 67	-	-
Postage and Stationery	737 33	107 46	28 50
Freight and Express	201 73	123 59	4 87
Heat, light and power	557 13	76 03	-
Chemical and laboratory supplies	79 30	242 21	110 00
Seeds, plants and sundry supplies	536 63	153 76	-
Fertilizers	110 00	-	-
Feeding stuffs	635 35	1,619 31	-
Library	608 81	39 10	-
Tools, machinery and appliances	332 66	44 87	-
Furniture and fixtures	269 85	267 86	85 65
Scientific apparatus and specimens	161 61	223 69	-
Live stock	39 98	3 00	10 00
Traveling expenses	541 50	324 93	10 66
Contingent expenses	60 00	117 42	-
Buildings	332 49	40 40	-
Total	$15,000 00	$15,000 00	$5,000 00

REPORT OF TREASURER FOR FISCAL YEAR ENDING JUNE 30, 1916 —Concluded.

DISBURSEMENTS.

RECEIPTS.	Aroostook farm.	General account.	Inspection analysis.
Salaries	$1,205 00	$3,257 65	$10,567 67
Labor	2,611 05	2,126 90	-
Publications	-	-	-
Postage and stationery	30 16	233 93	486 06
Freight and express	32 80	238 47	170 86
Heat, light and power	56 52	55 87	376 77
Chemical and laboratory supplies	-	41 36	496 71
Seeds, plants and sundry supplies	541 43	1,353 77	47 46
Fertilizers	-	87 00	-
Feeding stuffs	38 92	231 15	-
Library	-	66 84	-
Tools, implements and machinery	321 09	76 29	-
Furniture and fixtures	400 83	-	182 24
Scientific apparatus	-	2 21	206 65
Live stock	255 00	542 00	-
Traveling expenses	76 29	180 30	127 27
Contingent expenses	62 39	116 50	12 83
Buildings	983 42	102 25	-
Total	$6,614 90	$8,712 49	$12,674 52

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